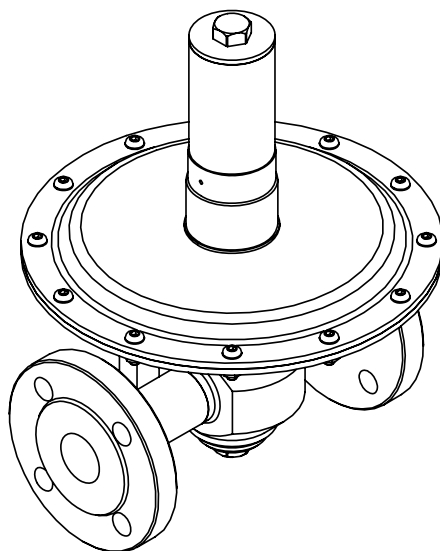


Inertisation / Tankblanketing regulators



USER MANUAL TBVS8

Read the complete manual before installing and using the regulator.





WARNING

INCORRECT OR IMPROPER USE OF THIS PRODUCT CAN CAUSE SERIOUS PERSONAL INJURY AND PROPERTY DAMAGE.

Due to the variety of operating conditions and applications for this product, the user is solely responsible for making the final proper decisions concerning the correct assembly and functioning of the product and assuring that all the performance, safety and warning requirements are met.

- Users must be trained and equipped for the handling, use and servicing of pressure products and systems.
- Users must contact their gas or liquid supplier for specific safety precautions and instructions.
- Gaseous media should be free of excessive moisture to prevent icing at high flow.
- Always wear the appropriate protective clothing, including safety glasses, gloves etc. if required.
- Follow the applicable safety and maintenance procedures.
- Obey specific local regulations.
- Do not exceed the maximum inlet and outlet pressure of the product or its accessories.
- Operate within the temperature limits and other conditions specified for the product.
- Do not to drop or damage the product in any other way. This may negatively effect the performance of the product which can cause the product to malfunction.
- Venting fluids and gases can be dangerous. Vent to a safe environment away from people. Ensure adequate ventilation.
- This product is not oxygen clean and therefore not suitable for oxygen service.

If there are questions or problems regarding the installation, operation and maintenance these should be directed to the proper authority on site before continuing.

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1 Introduction

1.1 Detailed description

This regulator is a diaphragm sensing spring loaded back-pressure regulator, designed to regulate low pressures at medium gaseous flow.

The back-pressure regulator keeps control of the inlet pressure. If the inlet pressure exceeds the set pressure, the valve opens and gas starts to flow.

It is ideal for highly accurate control of pressure because of its large effective sensing area. Because of the low friction valve guidance, the regulator is ideal for use in low pressure tank blanketing as a vent valve (back-pressure regulator).

The regulator comprises a body and spring housing bolted together. The valve and seat can be taken out, by disassembling the regulator.

The product is designed to be used at ambient temperatures between -20 °C and +80 °C. The limits of the medium temperature depend on the seals used.

The TBVS8 comes standard with a soft rubber seat-seal, for leak tight shut-off in zero flow conditions. The regulator can stand high inlet pressure, because of the solid construction.

The maximum in- and outlet pressure for the TBVS8 are:

- Inlet- / Outlet pressure vacuum (minimum) – 6 bar (maximum)

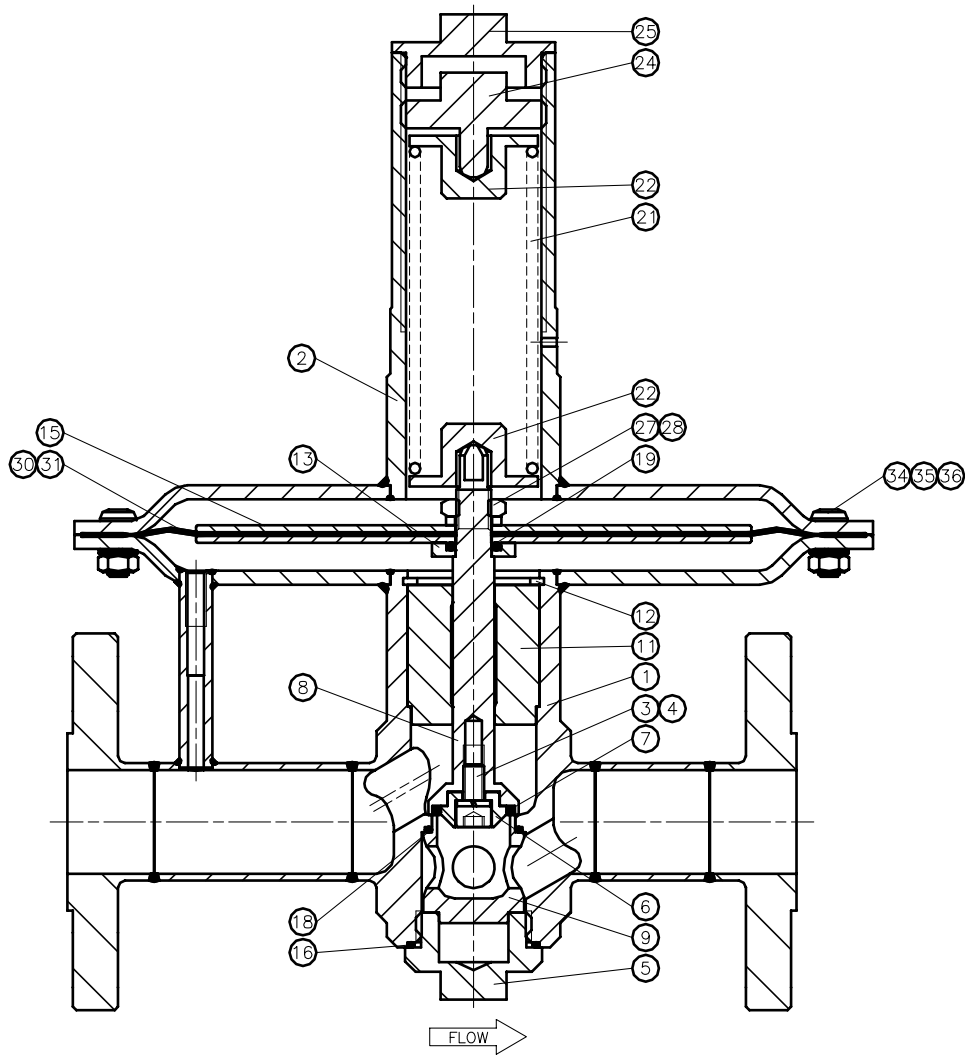
Standard features:

- ss 316L throughout
- diaphragm sensing
- 4 pressure ranges
- 21 mm seat
- internal pressure sensing

1.2 Special features and options

- different line connections
- different seal materials

1.3 Typical picture of the TBVS8



| | | | | | | | |
|---|------------------------|----|--------------------|----|-----------------------|--|--|
| 1 | body assembly | 11 | valve guiding ring | 24 | setscrew | | |
| 2 | springhousing assembly | 12 | retaining ring | 25 | springhousing cover | | |
| 3 | ring | 13 | seal housing | 27 | ring | | |
| 4 | socket head screw | 15 | diaphragmplate | 28 | nut | | |
| 5 | bodyplug | 16 | o-ring | 30 | diaphragm | | |
| 6 | valve ring | 18 | o-ring | 31 | support diaphragm | | |
| 7 | valve o-ring | 19 | o-ring | 34 | nut | | |
| 8 | valve stem | 21 | setspring | 35 | ring | | |
| 9 | valve seat | 22 | springguide | 36 | socket head cap screw | | |
| | | | | | | | |

2 Installation



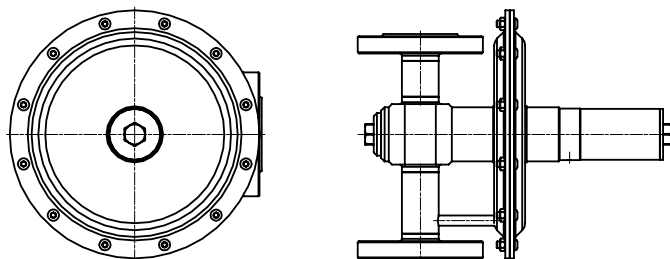
WARNING

A BACK-PRESSURE IS NOT A SAFETY VALVE AND SHOULD NOT BE USED AS SUCH

2.1 Points of attention before installation

This regulator can be equipped with different options and connections.

Before installing the regulator you, should fully understand the options and the suitability of your particular regulator and its suitability for the application.



sketch with mounting modes

- The preferred mounting position of the regulator is vertical with the springhousing facing horizontal. (see above sketch). The reason is the weight of the diaphragm plate, in this position it does not effect the regulation.
- Avoid sealing compounds which harden, be careful with anaerobic (loctite type) compounds. Particles of these compounds can run into the regulator and lock moving parts.
- Frequent assembly and disassembly of the in- and outlet fittings can damage the in- and outlet thread of the regulator. Damaged threads can cause serious injury.
- It may be necessary to remove the regulator from the system during maintenance or service. Make sure that this is possible.
- The regulator is suitable for gases. Check if the materials on the assembly drawing, which came with the regulator, are compatible with the used media.
- The product is designed to be used with the ambient temperature between -20 °C and +80 °C. The limits of the medium temperature depend on the used seals.
- The regulator is standard not oxygen clean. Although all regulators are ultrasonically cleaned, this does not make them suitable for oxygen use.

2.2 Installation instructions

- Verify that the regulator, the connections and its accessories are undamaged.
- Verify that the regulator and its accessories are suitable for the system operating pressure and have the proper connections.
- Carefully clean all pipes and connections. **Any swarf, lint, wire etc. may cause seat leakage.**
- Verify the flow direction of the system and mount the regulator accordingly.
- Securely make the appropriate connections to the regulator in accordance with the procedures recommended by the manufacturer of the connections.
- Verify that the regulator is mounted in the system without stress on the connections. Stress on the connections can result in faulty connections and dangerous situations.
- Make sure the maximum inlet-and outletpressure cannot exceed 6 bar.
- Shut-off valves should be mounted in the system for service or maintenance.
- If earthing is required, connect an earth wire under a springhousing bolt.

3 Operation

3.1 Required tools for operation

Use a socket wrench (19 mm) with an extended piece to change the set pressure.

3.2 Points of attention before operation

- The product can be hot or cold, depending on the environment temperature and the used media temperature. Take the necessary precautions before operating or touching the product.
- If this regulator is used with hazardous or toxic media, take the necessary safety precautions to ensure a safe workspace and your personal safety.
Vent to a safe environment away from people and ensure adequate ventilation.
- After flow, the inlet pressure will fall a little under the set pressure.
This is because of the closing force required for bubble-tight closing of the regulator.
This phenomenon is usually referred to as the “**reseat pressure**” and does not indicate a problem with the regulator.
- An increase in the flow will result in a rise of the set pressure.
A decrease in the flow will result in a fall of the set pressure.
This is because of the force required for opening the valve of the regulator.
This phenomenon is usually referred to as the “**accumulation pressure**” and does not indicate a problem with the regulator.
- An increase of the outlet pressure will result in a fall of the set pressure.
A decrease of the outlet pressure will result in a rise of the set pressure.
This phenomenon is usually referred to as the “**dependency**” and does not indicate a problem with the regulator.

3.3 Changing the set pressure

- Check the supply of medium at the inlet side.
- Make sure the inlet pressure is higher than the required set pressure and that the inlet pressure does not exceed the maximum allowed inlet pressure. Open the shut-off valve at the outlet side.
- Open the shut-off valve at the inlet side slightly to allow a minimal flow.
- Turn the adjustment knob clockwise to increase the set pressure.
- Turn the adjustment knob counterclockwise to decrease the set pressure.



A shut-off valve on the outlet side must be opened to relief the pressure on the outlet side.

Final adjustment must be made while increasing the set pressure to obtain the most accurate set point(s).

- Reduce the inlet pressure until there is no more flow.
- Open the shut-off valve at the inlet side fully to allow full flow during operation.

4 Maintenance



WARNING

INCORRECT OR IMPROPER REPAIR OR SERVICING OF THIS PRODUCT CAN CAUSE SERIOUS PERSONAL INJURY AND PROPERTY DAMAGE.

SWAGELOK B.V. recommends the product to be removed from the system and to be shipped to SWAGELOK B.V. for service or maintenance as all regulators must pass rigid acceptance tests before leaving the factory.

All repairs and servicing of this product must be performed by factory certified personnel and tested for operation and leakage.

If this procedure is not followed for any reason, or if any customer changes are made to the product, SWAGELOK B.V. cannot assume responsibility for the performance or safety of a customer repaired product or for any damage resulting from failure of the product.

The product should be checked periodically for proper and safe operation.

It is the users sole responsibility to determine the frequency of maintenance based on the application.



RECOMMENDATION

SWAGELOK B.V. RECOMMENDS TO HAVE SPARE-PART KITS READILY AVAILABLE ON SITE.

All regulators require maintenance at scheduled intervals. Annual maintenance is recommended under normal use.

From experience SWAGELOK B.V. can tell that especially during the start-up of a system, the demand for spare-part kits is there.

Despite all the effort taken to assure a clean system, there is usually some debris left in the system, which can damage the regulator.

Having spare-part kits on site will save time and money, as the downtime of the system will be reduced to a minimum, whether during start-up or normal operation.

4.1 Required tools for maintenance

- a vice to fasten the regulator
- pincers to take out the o-rings
- a torque wrench
- a torque wrench hexagon head key 5
- socket wrenches 10 / 17 / 19
- open end wrench, 6 mm
- snap ring pliers for retaining ring 38
- media and temperature compatible lubricant for reassembling threaded parts
- media and temperature compatible lubricant for o-rings
- soapy water for leak-testing

4.2 Points of attention before removal from the system

- SWAGELOK B.V. recommends removing the regulator from the installation.
- Make sure that a spare-part kit is present.
- Check if the used media is hazardous or toxic.
If required take the necessary safety precautions to ensure a safe workspace and your personal safety.
Vent to a safe environment, away from people and ensure adequate ventilation.
- Follow your system safety, maintenance or special local procedures when removing the regulator.
- The product can be hot or cold, depending on the environmental temperature and the used media temperature. Take the necessary precautions before operating or touching the product.

4.3 Removal from the system

- Isolate the regulator from all pressure sources by closing the appropriate valves in the system.
- Turn the setscrew counterclockwise to decrease the setpressure; a shut-off valve on the downstream side must be opened to relief the pressure.
- Make sure, the inlet and outlet pressure are both reduced to zero and the setscrew is turned counterclockwise until there is no more spring force on the setscrew.

4.4 Disassembly

- Loosen the socket head screws (12 pcs.M6) and remove the springhousing and the setspring.
- Loosen the nut on the valve stem and remove the diaphragm plates and diaphragm.
- Remove the retaining ring, and take out the valve guiding ring and the valve assembly.
- Loosen the bodyplug from the body and remove the bodyplug and seat.
- Loosen the socket head screw from the valve assembly and remove the valve o-ring.

4.5 Inspection of disassembled parts

- Check all parts for abnormal wear. Replace all parts in case of doubt.

4.6 Points of attention before assembly

- All parts must be clean and undamaged before starting assembly.
- SWAGELOK B.V. recommends replacing all o-rings and the diaphragm before assembly.
- All threaded parts must be lubricated a little before assembly, this to avoid galling of threads.

4.7 Assembly

Follow the points for disassembly in reverse order to assemble the regulator.

4.8 Recommended torques

| | | |
|---|-------------------------------------|-------|
| - | Bodyplug | 40 Nm |
| - | Valve assembly socket head screw | 10 Nm |
| - | Nut on the diaphragmscrew - M10 | 10 Nm |
| - | Socket head cap screws - 16 pcs M06 | 10 Nm |
| - | Springhousing cover | 5 Nm |

4.9 Testing

Check the TBR8 for leakage across the seat, bodyplug and the diaphragm.
Check the required setpressure range and function.

- Turn the setscrew clockwise, a few turns.
- Maintain a test pressure on the upstream side of the regulator.
The upstream pressure will increase till it reaches the setpressure.
- Vent a bit of the inletpressure, to check leakage across the seat.
- Set the regulator at the maximum setpressure.
- Check for leakage across the diaphragm and check the small hole in the springhousing for bubbles by using a little soapy water.
- Check for leakage across the bodyplug.

If there is leakage across the seat or the diaphragm, the damaged parts must be replaced.

5 Trouble shooting

| | |
|-----------|--|
| Problem: | Constant leakage from the outlet before the relief set pressure is reached. |
| Cause: | A damaged valve and/or seat o-ring. |
| Solution: | Replace the valve and/or seat o-ring |
| Problem: | Constant leak through the hole at the side of the springhousing. |
| Cause: | Damaged diaphragm, or not enough torque on the nut on the diaphragmscrew. |
| Solution: | Replace the diaphragm, or tighten the nut. |
| Problem: | Leakage between the body and the springhousing. |
| Cause: | A damaged diaphragm or insufficient torque on the bolts. |
| Solution: | Check the torque on the bolts or replace the diaphragm. |
| Problem: | The required set pressure can not be reached. |
| Cause: | The inlet pressure is not high enough. |
| Solution: | Make sure that the inlet pressure is sufficient. |
| Problem: | The outlet pressure rises too much when flow increases. |
| Cause: | There is too much flow passing through the regulator. |
| Solution: | Check the specific application data with the flow tables in our documentation. Note that the differential pressure over the seat is very low. |
| Problem: | The regulator keeps venting in a tankblanketing application. |
| Cause: | Thermal expansion of the blanket gas. |
| Solution: | This is not a problem, the regulator functions well. |
| Problem: | The regulator is placed in the system, and has different flow characteristics than printed in the documentation. |
| Cause: | Inside diameter of the piping or fittings are too small. Piping too long. |
| Solution: | Install the regulator with proper piping and connections. Consider the pressure drop caused by piping resistance. |

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty.
For a copy, visit swagelok.com or contact your authorized Swagelok representative.